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CALCULOUS CHOLECYSTITIS

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CERTIFICATE

This is to certify that this dissertation entitled **"CALCULOUS CHOLECYSTITIS" bo**nafide record work done by **Dr. S SIVAKUMAR** submitted as partial fulfillment for the requirements of **M.S. Degree Examinations Branch I, General Surgery, SEPTEMBER 2006.**

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INTRODUCTION

Gall Bladder is a pear shaped saccular organ, which stores bile, becomes a place for formation and growth of Gallstones. The Gallstone disease is more common in Western world Today the Incidence of cholelithiasis is increasing considerably in India, Possibly due to change in the dietary habits. Which is becoming westernized and the life style which is changing. In India, North India shows 7 times more incidence than that in South India.

The operations on biliary tree and gall bladder rank next only to Hernia repair and appendicectomy in Northern India. In Southern India, picture is not clear.

Prevalence of Cholelithasis, in Indian males and females is estimated as 4% and 6% respectively The exact incidence of cholelithasis is not known. Prevalence of cholelithasis shows Improved detection due to Imaging modalities particularly ultrasonogram.

Because of the Extensive studies of Etiology of gallstones and better understanding of the Pathogenesis in the past two decades, the management has become more appropriate and effective.

Proliferating research on the minimal invasive surgery especially after 1988 with the advent of Laparoscopic surgeries, Percutaneous removal of stones and

Extracorpereal shock wave lithotripsy has greatly motivated patients for undergoing early and effective management.

SURGICAL ANATOMY

GALL BLADDER

It is a pear shaped organ 7-10 cm long with a capacity of 30- 50 ml. It is located in Gall Bladder fossa found at the junction of quadrate Lobe (Segment IV) and the Right lobe of liver along the line of rex, and is enclosed within its peritoneal sheath on three sides.

Gall bladder can be divided into Fundus, Body, Infundibulum and neck.

FUNDUS

Projects slightly beyond the free margin of the liver, opposite the upper end of linea semilunaris. A partial folding of fundus may result in 'Phyrgian Cap' deformity. It was suggested that such gall bladders are at higher risk for lithiasis, but this has not been confirmed.

BODY

Occupies the Gallbladder fossa, covered by peritoneum on 3 surfaces. Sometimes GB is suspended in a mesentry, off the Inferior surface of the liver – wandering Gallbladder or rarely embedded deep inside the liver parenchyma Intrahepatic GB.

Occasionally, several anomalous peritoneal folds from the GB to the duodenum, colon, or stomach is seen in that order of frequency and are associated

with the pathway of a large gallstone ulcerating from Gallbladder into the Intestinal tract.

INFUNDIBULUM

It is the angulated posterior portion of the body between the neck and the point of entrance of Cystic artery. It may show a eccentric bulging on its medial aspect, called Hartmann's pouch, and is often associated with Impaction of stone.

NECK

Neck curves up and forward and then sharping back and downward forming an S to become the cystic duct Mucosal lining shows spiral folds give rise to 'spiral valve of heister' and may interfere with the passage of instrument.

BILE DUCTS

The right and left lobes of liver are drained by ducts originating as bile canaliculi in the lobules and these canaliculi empty into the canals of Hering in the Interlobular triads and these canals are collected into ducts, and finally outside the liver, the Right and left hepatic ducts. Right hepatic duct is formed by the union of the anterior and posterior segment ducts of the right Lobe of the liver at porta hepatis. The average length of RHD is 0.9 cm.

Left hepatic duct is formed by the Union of medial and lateral segment ducts of the left lobe of the liver and average length is 1.7 cm – common hepatic

duct is formed by union of the right and left hepatic duct and average diameter is about 0.4 cm. Its lower end is defined as its junction with cystic duct.

CYSTIC DUCT

Cystic duct joins the hepatic duct at an angle of about 40^{o}. The length of cystic duct and the manner in which it joins the hepatic duct vary. Obstruction of cystic duct leads to hydrops of Gallbladder, contains white bile, composed only of mucus.

COMMON BILE DUCT

Begins at the union of cystic duct and common hepatic duct and ends at the papilla of vater in the second part of the duodenun average diameter is 6mm.

CBD is divided into 4 portions

Supraduodenal, retroduodenal, pancreatic, Intramural.

Supraduodenal portion lies in the right free border of lesser onentum, to the right of the hepatic artery and anterior to the portal vein. Retroduodenal portion descends behind the 1^{st} part of the duodenum and the pancreatic portion tunnel the gland substance. Intramural portion takes an oblique path averaging 1.5 cm though the duodenal wall and receives main pancreatic duct inferiorly. And both of them end in the ampulla of vater on the posteromedial wall of the second part of the duodenum.

BLOOD SUPPLY

Cystic artery arises usually from the right hepatic artery, reaches the Gall bladder behind the common hepatic duct and traverses through the hepato cystic triangle of calot and branches into Anterior and posterior branch. The Extrahepatic bile ducts are supplied by right hepatic artery above and gastroduodenal artery below, with major trunks running along the medial and lateral walls of CBD, sometimes referred to as 3 o' clock and 9'o clock position.

ANOMALIES

It should be noted that considerable variations to the above description may exist. Those which occur most commonly are shown in figure. A knowledge of such anomalies is of greatest importance to the surgeon, for failure to recognize them at operation may lead to disaster.

SURGICAL PHYSIOLOGY

BILIARY SECRETION

Bile is secreted continuously by the liver cells (hepatocytes) into the biliary Canaliculi. Daily secretion is 500 – 1000ml per day. Bile is secreted at a pressure of 150 – 250mm of water. If obstructions occurs, liver continues to secrete upto the pressure of 300mm of water, there after secretion ceases.

Hepatic bile is slightly alkaline and Gallbladder bile is more acidic than Hepatic bile.

The primary bile salts are cholate and chenodeoxycholate, conjugated with taurine and glycine and excreted into the bile. 98% is reabsorbed by enterohepatic circulation. In the intestine Gut bacteria deconjugates the primary bile salts and forms secondary bile salts deoxycholate and lithocholate.

Two important functions of Bile salts are

(1) Formation of water soluble complexes with cholesterol, fatty acids and fat soluble vitamins and their absorption.

(2) Reduction of surface tension and emulsification of fat.

Bile salts are powerful cholerectic which increases hepatic bile production.

Cholesterol and Phospholipids synthesized in the liver are the principal lipids found. In bile. The colour of the bile is due to the presence of pigment bilirubin diglucoronide, which is the metabolic product of breakdown of Hemoglobin in the reticuloendothelial system. In the intestine, bacteria converts it into urobilinogen which is absorbed and excreted in urine.

FUNCTIONS OF GALLBLADDER

(1) Stores the bile and concentrates it.

(2) Periodically releases bile by contracting in response to meal.

(3) Acidification of hepatic bile.

(4) Production of glyco proteins.

Control of bile flow

It is under control of neurogenic, humoral, and chemical stimuli.

Vagal stimulation increases the secretion of bile, while splanchnic nerve stimulation results in decreased bile flow.

Hydrochloric acid, partly digested proteins and fatty acids in the duodenum stimulate the release of secretin from the duodenum that in turn increases bile production and bile flow.

Cholecystokinin also increases the hepatic secretion of bile.

Other substances, which have effect on biliary secretion are VIP, caerulin and GASTRIN.

Information regarding the emptying of Gallbladder is incomplete, because it is impossible to intubate the healthy GB.

In between meals, when sphincter of oddi is closed, Gall bladder fills up when the CBD pressure is high.

Substances which contract the GB are

(1) Cholecystokinin

(2) Cholinergic hormones

(3) Motilin

Substances which relaxes the GB are

(1) Pancreatic Polypeptide

(2) Somatostatin

(3) Glucogan

(4) VIP

AETIO PATHOGENESIS OF GALLSTONES

In spite of extensive research in the field of gallstones nothing conclusively has been put forward regarding the etiology and exact sequence of events that leads to the formation of gallstones.

The major question is why innocent gall bladder forms stones in few people alone. The subject of interest has turned to wards what makes gall bladder a factory for gallstone production.

Most of the studies conducted were from the western world where cholesterol stones are common. Japanese are the other people who have done a lot of research on this fascinating subject and who have Pigment stones commonly. Studies in India are limited. They point out that mixed stones are m ore prevalent in India.

CLINICAL CLASSIFICATION OF GALLSTONES

1. Pure cholesterol stone	:	10%
2. Pigment Stone	:	15%
3. Cholesterol-pigment mixed stone	:	75-80%

These can be analyzed by colour chromatography, thin layer chromatography and X ray diffraction. In 1924 Aschoff classified the stones into 4 categories

1. Inflammatory.
2. Metabolic:

   Pure pigment [calcium Bilirubinate] and pure cholesterol.
3. Combination stones:

   Primary – metabolic

   Secondary - Inflammatory
4. Stasis stones

   Primary stones of CBD.

Cholesterol Stones

Crystallographic studies such as X ray diffraction method have demonstrated that more than one form of Cholesterol may exist in stones, collected under different conditions.

Cholesterol is -usually present as single crystals mainly as Cholesterol monohydrate, whose axes are radially oriented with respect to the nucleus. Cholesterol stones may also contain calcim carbonate and calcium palmitate. They are usually single, light yellow or even pure white, rounded or oval, being compared to unripe mulberries.

Pure Pigment Stones [Calcium Bilirubinate)

They are multiple, small and dark. Japanese have worked extensively in this type of stones as prevalence is very high in Japan. Two types are recognized :-

1. Calcium Bilirubinate stones found in oriental countries are associated with Ascariasis or E. Coli.
2. Pure pigment stones occurring without any infection but sometimes with haemolysis.

These stones are dark or reddish brown and fragile. Some stones are black or dark green.

Mixed Stones

These form the majority of the stones [75-80 %] which are multiple and multifaceted. The central portion of the stones represent the events occurring during initial stages of stone formation. They contain cholesterol, pigments, protein and sometimes parasites.

RISK FACTORS FOR PIGMENT STONES

DEMOGRAPHY

Oriental countries are more affected than the western world. Indian studies at Aligarh College concluded that mixed stones are the predominant variety in India [Vijay Pal et.a1.,1980). But in Kashmir the situation is different. The cholesterol stones are common.[Khuroo et.al.,1986).

Among the Orientals, Japan records the highest prevalence of pigment stones. Rurals are more affected than Urban. This is ascribed to the fact that parasitic infestation of the biliary tract is common in rural Japan. But evidences .supporting this are lacking.

In Asians, brown pigment stones are common, and frequently associated with E.coli infected bile. The location of stones also differs from the Cholesterol stones. The pigment stones mainly occupy the gall bladder and the common bile duct. Intrahepatic pigment stones are unknown.

HAEMOLYTIC ANAEMIA

Conditions with decreased life span of red blood cells including haemolysis from prosthetic heart valves, malaria, haemoglobinopathies and membrane defects like hereditary spherocytosis are associated with pigment stones. Probably the increased production of conjugated bilirubin into bile leads to increased formation of stones but evidences are lacking.

ALCOHOLIC CIRRHOSIS

Pigment stones are more common among patients with cirrhosis than among nor mal persons. The mechanism underlying this association is unknown, although the

hypersplenism and mild haemolytic anaemia that often accompany cirrhosis might be suspected of contributing to this increased incidence of gallstones.

INFECTED BILE

This is the oldest theory of gallstone formation.

No infection – No stone.

The Naunya's theory has got general support. Hence the nidus of stones is formed not only by bacteria, but also by inflammatory exudate or cellular exfoliation, parasites, and ova.

Moynihan has aptly described "Gallstone is a tomb stone erected to the memory of organism within it".

Bile bathing the gallstones is infected in Japanese. The most common infecting organism is Escherichia coli, a producer of Beta Glucuronidase which increases bile saturation by increasing unconjugated water insoluble bilirbin[47].

Addition of glucuronidase, to bile in vitro resulted in the precipitation of calcium bilirubinate. D-glucuronic acid, an inhibitor of glucuronidase prevented the formation of calcium bilirubinate. Mechanisms other than the deconjugation of bilirubin may also be involved in the association of the pigment stones with biliary infection. Ascaris lumbricoides, Round worm eggs are effective nucleating agents for the precipitation of calcium bilirubinate in vitro and may play similar part in vivo. Over half of the stones examined in a large series in Japan showed ova of Ascaris lumbricoides. Another report from Vietnam showed this that roundworm eggs were found in 70% of gallstones there.

Parasitic infestation causes inflammation of the gall bladder as well as local chemical changes favourable to the precipitation of calcium salts.

Inflammation does the following

1. Reduces the gall bladder motility.
2. Distorts the intrahepatic bileducts.
3. Interferes with the concentrating ability of the gall bladder and impairs the cholesterol dissolving capacity of the gall bladder bile.

AGE

Like that of Cholesterol stones, the frequency of pigment stones increases with age. Predominantly seen during the 5th to 7th decade. Before the 1st decade, pigments stones have been rarely reported in cases of congenital haemolytic diseases.

SEX

According to various Western texts, femaleness is not a risk factor for the pigment stone Indian studies show increased incidence in female sex. [Vijaya Pal et.a1., 1980 ; Gupta, 1967]

OBESITY

Has no definite role in the pigment stone formation. Pancreatitis, Total paraenteral nutrition and the advanced primary hyperparathyroidism are associated with pigment stones.

RISK FACTORS FOR CHOLESTEROL STONES

DEMOGRAPHY

Rate appears to be the highest in the Scandinavian countries and Northern Europe while North and South America have higher incidence. Sub sahara and Asia reports very low incidence .Puma tribes of Arizona has the highest prevalence around 70 % due to its biological disposition to formation of the gallstones.

INDIAN SITUATION

The prevalence of cholesterol Stones is higher in North-lndia.Kashmir in particular has the highest prevalence of the cholesterol stones which is comparable to Western Countries.

AGE AND SEX

The greatest incidence occurs between the 5^{th} and 8^{th} decade Incidence is rare below 20 years old. In females Gallstones tend to occur more than in males, irrespective of the age, race etc., After puberty the ratio between Females to males is 3:1 to 4:1 Why females are affected more? Possible hypothesis are

1.Estrogen and its effects

2. Progestrone and its effects.

ESTROGEN

Exogenous

Several studies have confirmed that an association between gall stone and use of exogenous estrogens, whether as oral contraceptives, post menopausal estrogen replacement or estrogen administered to men.

The possible mechanisms are explained as follows

1. Decreased chenodeoxycholic acid
2. Increased Cholesterol saturation
3. Increased Cholesterol secretion
4. Cholestasis occurring with estrogens

Endogenous

A definitely higher prevalence of gall stones among the females are documented in many studies through out the world. This sex difference appears to be being around the age of puberty and disappears around menopause

Like oral contraceptives, endogenous estrogen also reduces bile acid pool and increases cholesterol secretion and the saturation thereby increasing gall stone formation. Multiparity also shows an increased incidence of gall stones.

PROGESTERONE

Saturates bile

Relaxes smooth muscle

Impaired gall bladder emptying

All may predipose to gallstone formation.

FAMLIY HISTORY

Only first degree relatives have two fold risk while others studied showed no relationship. Siblings have a higher incidence of gall stone disease.

PARITY

With increasing parity, the gall stones are more common in young women probably due to repeated attacks on gall bladder by altered physiology of estrogen or progesterone on the biliary composition and smooth muscle function of the bilary apparatus.

OBESITY

In untreated obesity, Hepatobiliary tract disease is very much prevalent. The liver plays a key role in hyperlipidemia Predisposition to the gallstone formation can be attributed to increased biliary cholesterol secretion in concert with changed nucleating factors and altered motility Patient who tries to reduce weight by very low calorie diets, hashigh risk of the gall stone formation .

A large study conducted in obese people [1006 samples] shows in men and wome n of the 5th decade with obesity an increased. incidence of gallstones -1.7% and 1.8 % respectively. This is not very high when compared with that in the same age group without obesity. In these obese patients, Triglycerides were found to be high. Based on these observations, various mechanisms of gall stone formation in obese individuals are postulated.

1] Increased saturation of bile in obese individuals due to excessive biliary secretion of cholesterol.

2] Cholesterol synthesis is related to H M G CO A reductase enzyme. H M G C 0 A reductase production is related to plasma insulin which is higher in obese persons and high fat intake also increases this enzyme.

Since none of investigation modalities available can exclude gall blader disease in morbidly obese patients, a routine cholecystectomy is done in them during other surgical procedures. The subsequent studies of such removed gall bladder specimens showed 20% occurrence of gall stones in them [undetectable by any preoperative investigations].95 % of such patients showed some form of gall bladder disease other than cholelithiasis.

The risk of gall stone formation increases with increase in body mass index [wt/ht x 100] also called Quetlet index. The results are applicable to both females and males.

DIET

High calorie diet

Increased incidence of gallstones in persons taking high calorie diet was noted in France.[Sarles,1968]. This relation was obtained when matched for sex, body weight and the level of physical activity. The results suggested that adiposity and high caloric food increased cholesterol secretion which predisposed them for gall stone formations

High consumption of simple sugars predisposes individuals to gall stone formation. An inverse relation to serum cholesterol has been reported [Lefflers, 1946].

Low calorie diet

Concern has been expressed that weight reduction diets might favour the formation of lithogenic bile through a marked reduction in bile acid secretion. This increase in lithogenic bile occurs through a marked reduction in bile acid secretion. Possible events that lead to formation of the gallstones in patients who were dieting for weight reduction is shown in the flow chart.[Table ~]

High cholesterol diets

The exogenous cholesterol can contributes to the biliary cholesterol pool and increases its saturation. The main problem in man is that the cholesterol is not converted to bile acid unlike in animal species ;instead it is reexcreted many times by the liver . The

magnitude of increase is modest, however suggesting that the effects of excess dietary cholesterol on bile composition are not as great as those associated with increased cholesterol synthesis.

Poly unsaturated fats [PUSF]

There were conflicting reports regarding the increased incidence of gall stones associated with intake of food rich in PUSF chronically for years.

Fiber

Lack of dietary vegetable fiber has been suggested as a possible cause of a variety of gall bladder diseases. However there are no reliable data on this point. Studies of diet rich fiber versus low demonstrate a reduction in the cholesterol saturation of bile in pigment stones. But a recent study executed carefully, proved no relation between them

ALCOHOL

Again results are controversial. Modest level of alchohol 30-60 miligrams per day reduces the risk. Alcohol causes increase in high density lipoprotein and reduction in low density lipoprotein, by which the biliary cholesterol saturation is reduced.

SMOKING

Results show inconsistency. It appears there is no relation except in one study by Layde Jorgenson which shows lower risk of gall stones with smoking. But Norma and Stemmerma have observed an increased incidence of the gall bladder disease in smokers.

DIABETES

A study regarding diabetes and the gallstones reported that the incidence of the gallstones in diabetics is 30 %. There is progressive increase in the incidence of the gallstones occurring in each age group beyond the third decade in both female and male diabetics, white and coloured. In diabetics beyond 50yrs of age, the gallstones were present in approximately one out of every two white women [Turrill et.aL, 1961].

Increased risk of gallstone formation associated with diabetes is attributed to

1. Supersaturation of bile with Cholesterol.
2. Fatty infiltration of the liver with altered lipid metabolism.
3. Hyperinsulinemia and its effects on lipids
4. Gallbladder dyskinesia due to autonomic neuropathy.

DRUGS

Effects of Cho1esterol lowering drugs

Clofibrate

An increased frequency of the gallstones among users of clofibrate has been shown in two large clinical trials of the efficacy of this drug in heart diseases. The specific mode of its action on lipids is not known but there is a definite increase in the incidence of gallstones. These findings are suggestive of increased mobilisation of Cholesterol from body fat stores by clofibrate which predisposes them for stone formation.

Bileacid Sequestrants - Cholestyramine and Colestipol

An increased incidence of gallstones among users of bile acid sequestrants has not been documented. When used alone they have no effect on Cholesterol and bile acid metabolism .They act by trapping bileacids in the gut and , increasing their fecal loss, thereby decreasing the total bileacid pool. But compensatory increase in cholic acid in liver prevents excessive loss of bileacids. When these drugs are combined the loss of bileacid is marked with increased lithogenicity.

Oral Contraceptives

Its role is described in detail with effects of estrogen [exogenous] on gallstone for mation. There is a definite increased incidence of gall stones among pill users

EFFECTS OF GASTR0 INTESTINAL DISORDERS AND SURGERIES

Ileal disease, resection and bypass

Bileacids are absorbed through out the length of the intestine, but especially in the ileum, where transport is more active. Bile acids return via portal vein and are resecreted into the bile in combination with newly synthesised bile acids. Bileacid synthesising capacity of liver is compromised in most of the patients due to disease process itself, which limits the normal functions of liver.

Truncal Vagotomy

The gall bladder and the bilary tract are supplied by Celiac plexus, which loses its connections due to vagotomy. It may alter the physiology of the gall bladder emptying, leading to stasis. It may lead to formation of the gallstones. This was long debated matter. But there is no definite increase in the incidence of the gallstones following truncal vagotomy as pointed out by various studies because the gall bladder becomes adapted to the situation in a matter of 3 months till then irregular emptying was noted.

Cystic fibrosis with pancreatic insufficiency

An increased prevalence of the gallstones has been noted among children with cystic fibrosis. The possible mechanism ascribed are

1. Increased mucus production and abnormal mucus

↓

Nucleation of stones

2. Interference with bileflow → stasis→promotes gallstone growth

3. Reduced bileacid pool due to interference of bileacid reabsorbtion due to poorly secreting pancreas.

DIAGNOSIS

CLINICAL FEATURES

It depends on the site of the stone. A stone which is situated in the gall bladder may remain asymptomatic lifelong. But w hen it tries to move out of the gall bladder may get obstructed at the neck of the gall bladder resulting in cholecystitis and dull aching continuous pain. If the gall bladder contracts against obstruction, colicky pain in the right hypochondrium will result. The obstruction at the neck may become relieved and the stone may fall back into the gall bladder or passed into the C B D.

In the common bile duct if the stone passes without much of obstruction it will merely produce mild pain, fever and jaundice. But if it is obstructed surgical jaundice will result. Intermittent pain, fever, jaundice may ensue. It is called charcot's triad. It is due to transient attacks of cholangitis. If this is accompanied by CNS disturbances and shock, then it is called Reynauld's pentad.

The stone that is obstructing the ampulla of Vater may cause pancreatitis in addition to cholangitis.

SYMPTOMS

Silent gallstones: Asymptomatic

Acute cholecystitis:

1. Right hypochondrial continuous dull pain sometimes spreading to entire upper abdomen.
2. Pain may be referred to right scapula, right shoulder or rarely to left side.
3. Pain lasts for 30-60 mts without relief.
4. Attacks may be precipitated by fatty foods or heavy meals or mere palpation of abdomen.

. The perspiring sufferer may lie motionless in a curled up posture.

Chronic cholecystitis:

In chronic cases abdominal distension, fullness eructation, flatulent dyspepsia following fatty meals is common.

SIGNS

Acute cholecystitis:

Abdominal movements with respiration decreases considerably. Local rigidity and tenderness ensue. cutaneous hyperesthesia is maximal at 8th or 9th right thoracic segments posteriorly [B0AS SIGN] and right upper abdominal muscles are rigid. Gallbladder will not be palpable according to Courvoisier's law but it is not always true. occasionally a tender mass of gall bladder with adherentomentum may be felt. On deep inspiration when a hand is kept below right hypochondrium, catching of breathing occurs due to severe tenderness. Liver edges may be tender.

Chronic cholecystitis:

Gallbladder is usually not palpable. Except for right hypochondrial tenderness nothing is specific

Choledocholithiasis:

1. Charcot's traid may be seen

2. If a large stone obstructs C B D then patient will have surgical jaundice passing clay colored stool, thick yellow urine and deeply jaundiced.

A stone obstructing the ampulla of Vater may result in epigastric pain, spreading to back with rigid upper abdomen and peritonitis due to pancreatitis

Differential diagnosis for acute Cholecystilis

GIT

1. Acute Retrocaecal appendicitis/subhepatic appendicitis
2. Leaking duodenal ulcer.
3. Acute pancreatitis [may be a feature of cholelithiasis itself]
4. Intestinal obstruction.

Abdominal wall

5. Bornholm's disease [Epidemic myalgia]

Heart

6. Coronary artery disease [most common D/D]

Lower Abdomen

7. Mesenteric vascular occlusion [rare]
8. Pyelonephritis
9. Salpingitis in Women

Liver

10. Acute Hepatic congestion
11. Hepatic crisis of sickle cell anemia.
12. Hepatitis and Liver abscess.

CNS

13. Radiculitis

LUNG

14. Right lobar pneumonia

Differential diagnosis for chronic cholecystitis

1. Peptic Ulcer: Commonest differential diagnosis and almost all patients would have had treatment for peptic ulcer.

2. Hiatus Hernia: An associated feature in Saint's traid may mimic chronic cholecystitis.

Differential diagnosis for Choledocholithiasis with jaundice

Biliary stricture and neoplasm

Ampulla of Vater growth

Head of the pancreas growth

Chronic calculous pancreatitis.

Mirrizi syndrome.

INVESTIGATIONS

PLAIN ABDOMINAL RADIOGRAPHS

The films are usually obtained in AP projection. Special view to visualise the gall bladder like penetrated AP film over the gall bladder area in a suspected case of calculous Cholecystitis is more contributory to the surgeon.

The gall bladder lies usually parallel to spine at the level of 11^{th} and 12th ribs. Fundus lies usually in opposition to the duodenal cap and anterior to renal shadow.

Only 10 % of the gallstones are radio opaque, in contrary to renal stones, which are 90 % radio opaque. 10 -20 % of cholesterol stones and 50 % of pigment stones are radio opaque. The opacity is due to the presence of calcium greater than 4 % as carbonate or phosphate. Rarely calcification of the gall bladder wall and presence of air when com munication exist between the intestine and the gall bladder as fistula can be detected.

ORAL CHOLECYSTOGRAPHY[**OCG**]

Until mid 1970's oral cholecystogram was the golden standard for the evaluvation of the gall bladder diseases. With the advent of ultrasonogram and hepatobiliary scintigraphy the role of cholecystogram has becomevery much limited, almost virtually eliminated from routine investigations of Cholelithiasis and biliary tract pathologies.

Graham and Cole [1924] introduced oral cholecystography Iopanoic acid [T elepaque] and Sodium tyropaonate [Bilipaque] are the dyes commonly used.Standard dose is 3g [6 tablets of telepaque].Patient is advised to avoid fat for 3 days. At 9 pm tablets are taken orally. Overnight fast is observed. X -rays are taken on next day morning at 9 am. A fatty meal is given and X-ray is taken after 45 minutes. This film will show contractability of the gall bladder. If the gall bladder is not visualized a double dose [6g] is given and reexamined. If the gall bladder still not visualized, the gall bladder disease is certain.

Visualisation of the gall bladder depend on both cystic duct patency and the gall bladder mucosal capacity to absorb water and concentrate the contrast.

Causes for non visualisation of the gall bladder are given below

occlusion of cystic duct

Chronic cholecystitis

Serum Bilirubin more than 2.5 Mg m%

Trapping of the tablet in GIT

Malabsorption syndromes

Diarrhoea

Diminished liver function

Presense of filling defects that seeks gravitational dependancy are diagnostic of cholelithiasis. Floating stones indicate high cholesterol content. Contrast material adheres to the surface of the stone and mimics calcified rim [salzmann effect].

Filling defect not moving when patients position is altered is unlikely to be a gallstone. The accuracy of oral cholecystogram is around 90%.

ULTRASONOGRAM

In imaging the gall bladder ,real time ultrasonography has made ultrasonogram a primary diagnostic technique. The revolution brought about by ultrasonogram is attributed to its simplicity, repeatability and noninvasiveness. Rapid diagnosis of the gall bladder and bilary tract pathology without a need of exposure to ionising radiation, medication, double dose examination etc., are possible with USG. The surgeon feels m ore secure and definite when operating on a patient with cholelithiasis shown by USG than with a non visualised gall bladder of oral cholecystography.

Static or real time grey scale B mode equipment with transducers, frequencies ranging between 2.5 to 5.0 MHz are used. 5 MHz frequency allows best resolution "and assessment of the size.

Focal zone is the narrowest part of the beam that must be matched to the location of stone for best image. Fasting for 6-8 hrs prior to examination is required.

Major Criteria for cholelithiasis are

1. Echogenic focus
2. Acoustic shadow
3. Gravitational dependence.

The specificity is 90 %, sensitivity is 85 %, accuracy is 95 % and false negativity is 2-9 %.

In 10-15% cases gallstones may be missed mostly when they are less than 5mm in size, especially when impacted at the neck of the gall bladder. Sometimes in very obese and fatty individuals USG has some difficulties. The normal size of the common bile ductis4-7mm.

CTSCAN

This is not a routine investigation. But useful in very fatty persons when USG fails to give a clear picture. No special preparation is needed other than fasting for 12 hrs. A series of 8-10 transverse and 5-6 longitudinal scans are performed. It is also useful in patients with a large amount of gas in the bowel and in jaundice when an associated cause can be eliminated precisely.

Its sensitivity could never equal that of an ultrasonogram. Also exposure to radiation is always there.

MAGNETIC RESONANCE 1MAGING

At present the value and limitations of magnetic resonane imaging as a diagnostic modality in gall bladder disease cannot be conclusively determined. M RI imaging of the gall bladder presently has no indication. The use of contrast both oral and intravenous administration may offer new prospectives of M RI in the diagnosis of the diseases of the gall bladder.

INTRAVENOUS CHOLANGIOGRAM

With the advent of modern and safe, non invasive diagnostic modalities the role of intravenous cholangiogram has almost become a history rather than a rare investigation, which was once upon a time was a routine investigation of the biliary tract diseases. After 1970 with the advent of P T C, ERCP, USG and C T Scan, nowadays cholangiogram is rarely done.

The contrast material used is methylglutamine Ioglycamate [cholegraffin or Biligraffin] 20 ml dose 52 % solution. It is given intravenously as infusion. It appears in bile in few minutes and permits the radiological visualisation of the bile passages than the gall bladder. Oral cholecystography is superior in visualising the gall bladder. Indications

- Intolerability to oral contrast materials.
- Post Cholecystectomy syndromes.

Contraindications

- Raised Plasma Bilirubin more than 3 mgm/100 ml.
- imparied Renal and liver functions

- Previous 0 C G within 48 hours.
- Paraproteinemias
- Thyrotoxicosis
- Sensitivity to contrast materials.

Following could be assessed in IV Cholangiogram

- Duct size, termination, filling defects in the lumen * Flow of contrast into the duodenum
- Any retrograde filling of the intrahepatic radicles.

PERCUTANEOUS TRANSHEPATIC CHOIANGIOGRAPHY

Huard and Doxylon Hop first described the technique of percutaneous transhepatic cholangiography in 1937. The procedure was sparingly used for 30 years due to lack of fine chiba needles [23 gauge]. Till the introduction of Chiba needles 18 gauge needles were used which resulted in high incidence of intraperitoneal haem orraghe and laprotomy subsequently.

Technique

A duct which should be within the liver to lessen the chance of intraperitoneal bile leakage is chosen. Fluroscopy or image intensifier is ideal both for introduction of the needle and during the injection of the dye. After preparation and draping, needle is introduced in the 8th or 9th intercostal space in the midaxillary line parallel to the table.

Failure to enter the biliary tree is common particularly if the ducts are not dilated. Virtually all dilated ducts are opacified during the procedure.

Indications

- obstruction in Biliary tract.
- To know the site of obstruction.
- Failure of ultrasonogram and C T Scan in showing dilated ducts in a case of obstructive jaundice case.

Contra Indications and Preventive measures

- Significant coagulopathy from any cause
- Significant Ascites
- History of allergy to contrast material

- Suspected right lobe liver abscess
- Suspected case of Hydatid cyst.

Complications

Sepsis [most common]	3%
Biliary Leak	1-2%
Haemorrhage	.2%
Death	0-0.9%

Interpretation

In a normal study both common bileducts, right and left hepatic ducts are visualised. The cystic duct and the gall bladder may not be visualised. But it doesn't imply cystic duct obstruction always. But in a distal C B D obstruction absense of the gall bladder indicates cystic duct obstruction or cholecystectomy. The site of obstruction will be delineated clearly but cause may not be predicted always. Filling defects in the lumen indicates gallstones.

ENDOSCOPIC RETROGRADE CHOLANGIO PANCREATOGRAPHY [ERCP]

In 1972 Kasugai et.al, first reported a success rate of 97 % in using fibroscopes to cannulate the ampulla of Vater. With the advent of side viewing endoscopy, today the success rate is almost 100 % in cannulating ampulla of Vater and injecting contrast dyes to visualise the biliary tract and the pancreatic system.

ERCP is far superior to C T Scan and ultrasonogra m study, because it gives an accurate delineation of the anatomy of the biliary and pancreatic ducts.

Bile duct is cannulated if the cannula tip is directed to wards 11 or 12 0' clock position approaching from below. If cannulation is difficult a precut sphincterotomy is useful. The contrast. injection into the ductal system should be done under fluoroscopy to avoid over injection there by preventing pancreatitis.

A normal cholangiogram shows biliary system with a smooth outline of the CBD normal CBDmeasures within 7 to 10 mm. Filling defects indicates gallstones.

Indications

- In post-cholecystectomy symptoms to demonstrate any dilatation of C B D due to stones.
- In case of obstructive jaundice to know the level of obstruction.
- As a pre-therapeutic procedure before removing CBD stones

Contraindications

Acute non-gallstone pancreatitis.

Complications

- Pancreatitis [0.7 to 7.4 %]
- Asymptomatic hyperamylasemia [15% cases]
- Cholangitis [0.8 %]
- Bleeding very rarely from the C BD system or the ampulla
- Perforation of the duodenum with cannulation is another rare but potential complication

Interpretation

Radiographically gallstones can be detected as filling defects in the ducts.

Limitations

ERCP is a complex procedure requires an experienced endoscopist, fluoroscopy control and sideviewing duodenoscopes. The facilities are mostly lacking in smaller hospitals. So P T C seems superior to ERCP in our country [Nandy, 1988]. Cost of ERCP is also high. ERCP may be used primarily to evaluate biliary and pancreatic disease in the absense of jaundice, after cholecystectomy and when percutaneous transhepatic cholangiography is contraindicated or failed.

RADIOISOTOPE SCANS

A Rose Bengal and 99 m Tc labelled derivatives of iminodiacetic acid dimethyl [HID A], Diethyl ID A or Isopropyl [DI5ID A] are used. Usual dose is 5 mg. 80 % of the isotope is excreted in bile and 20 % in the urine. It allows viualisation of the biliary tree even in hyperbilirubinemia up to 20 m g m/100mI. This detects acute cholecystitis almost in all cases.

The role of radio isotope scans are very much limited in the diagnosis of cholelithiasis. So this is not indicated in chronic calculous cholecystitis. But it has a definite role in Acute Cholecystitis.

MANAGEMENT

GALL STONE DISSOLUTION

ORAL DISSOLUTION THERAPY

Thistle & Schoenfield et.aL,.,[1971] were the first to show that oral administration of chenodeoxycholic acid to women with gallstones produced a significant rise in the ratio of Cholesterol solubilising agents to cholesterol in bile. These results were confirmed by Bell, Whitney and Dowling et.aL,., [1972].

Indications	**Contraindications**
➢ Functioning gall bladder	Chronic Liver Disease
➢ Radiolucent gallstones	Non Functioning gall bladder
➢ Stones<2c m in Diemeter	Radio opaque gallstones
➢ Patient unfit for surgery	Stones >2c m in Dia meter
	Inflammatory Bowel disease
	Women of Child bearing age
	Pregnancy

DOSE AND DURATIO N

Chenodeoxycholic acid in a dose of 5-25 m g m /kg of body weight has been tried in various trials, but 15 m g m/kg of body weight is adequate.

Duration of the treatment varies between 6 months and 2yrs depending on the size of the gallstones. Periodical ultrasonogram is needed to confirm that stones are dissolving.

SIDE EFFECTS

1. Diarrhoea due to secretion of water and eletrolytes by the colonic mucosa.
2. Hepatotoxicity.

Ursodeoxycholic acid, another agent to cause definite dissolution of gall bladder gallstones has equal efficacy with lesser diarrhoea and hepatotoxicity [Ma,kino, 1975].

3. Promotion of atherosclerosis.

4. Risk of carcinoima gall bladder & colon.

DRAWBACKS

Success rate is only about 40 % . If the treatment is discontinued the · chance of increase in the size is almost 100% . Even after complete dissolution the recurrence rate is very high. Oral dissolution is unsuitable for our tropical setup for the following reasons [Nundy and Tandon, 1988].

1. Expensive and unavailable.

2. Considerable drop out of patients

3. Poor patient compliance

4. Tendency to induce calcification of gallstone during the. treatment.

5. Cholesterol stones are rare in our country.

PERCUTANEOUS CHOLECYSTOLITHOTOMY

Recently Kellet and others [1988] have reported that gall stones can be removed from otherwise normal functioning gall bladders. It may prove to be complimentary to dissolution therapy or shock wave lithotripsy. This is performed with patient under G. A. adopting method and instruments used for one stage percutaneous nephrolithotomy. Potential complications such as bile leakage are likely to limit the use of this procedure.

SHOCK WAVE FOR GALLSTONES

Brendel and Enders[1983] from Germany have used shock wave treatments to treat kidney stones in humans. This same group have used similar shock waves for successful treatment of gallstones in humans. Just over four fifths of the 200 treated patients had a solitary stone less than 30 mm in diameter, and the remainder had two or three smaller stones. Adjuvant treatment with a combination of chenodeoxycholic and ursodeoxycholc acids was given to dissolve stone fragments. Shock waves were guided by ultrasound. Patients were immersed in water and given either epidural or intravenous analgesia.

Stones were fragmented in all but two patients. Side effects included mild pancreatitis in two patients and transient haematuria in 3 percent. Only patients with a radiologically functioning and contracting gall bladder are suitable for this therapy. This technology is expensive and will not yet be available in most countries.

DISSOLUTION AND FLUSHING OF BILE DUCT STONES

Flushing may be done with saline, heparinized saline or lignocaine Saline, via the T tube with pressure less than 30 cm H_20 to prevent cholangiovenous reflux and septicemia. The relaxation of sphincter of oddi may be acquired with synthetic peptide ceruletide.

Dissolution may be tried with Cholate infusions but its efficacy is very 1ow . So Mono- octanoin which more actively clears the stones is widely used. But the most effective agent is methylterbutylether [MTBE] which ,is capable of achieving gallstone dissolution within hours of instillation, in pure cholesterol stones.

OPERATIVE TREATMENT

Cholecystectomy is the ideal surgery for symptomatic calculous cholecystitis. It may be either early or interval. It has got another dimension recently whether open or laparoscopic. Early cholecystectomy in a carefully prepared patient in younger age groups has mortality and morbidity similar to elective cholecystectomy done 6-8 weeks after an acute attack.

CHOLECYSTECTOMY

Technique

A right paramedian or right subcostal incision is made. Soon after the abdomen is opened the whole biliary and pancreatic areas and the liver are examined for congestion, friability, any signs of ascending cholangitis or stones in the bile ducts.

Exposure of the operative Field

All steps of the operation must be carried out under direct vision with careful packing.

A large abdominal pack is used to push away the colon and a Deaver's retractor pulls this down and to the left, so that the upper margin of the duodenum is exposed. A second pack with Deaver's retractor pushes the stomach to the left and slightly up wards. A long rectangular type of retractor is placed medial to the gall bladder close to undersurface of the liver in order to rotate the liver slightly upward and thus a better view of portahepatis is obtained. Division of the visceral peritoneum: The peritoneum over the free edge of gastro-hepatic omentum is incised for 2-3 c ms near the area of the cystic duct and the porta hepatis and pushed side wards so that the cystic artery, cystic duct and bile ducts are exposed well.

Cholecystectomy starting at the cystic duct

This is the more generally accepted procedure. By securing cystic artery first, three things are accomplished:

i. The subsequent dissection is carried out in a relatively dry field;

ii. After the division of cystic artery, the cystic duct uncoils itself and w ill be straightened out and clearly defined up to the common bile duct.

iii. It eliminates the danger of serious bleeding from tearing of the cystic artery through traction upon the gall bladder. Since the cystic artery is a fine vessel, it is better if it is divided using an aneurysm needle. This artery is closely related to the cystic lymph gland of Lundh, which may help in identification of it.

Cholecystectomy starting at the fundus

This method is adopted in conditions where the identification of the duct system is more difficult. Such difficulty will arise in acute or chornic cholecystitis.

Espiner [1982] has described a modification is indicated when the gall bladder is very much thickened and inflamed, where seperation of the gall bladder bed is carried out in the sub mucosal plane using a diathermy.

Lahey used finger technique for dissection of Calot's triangle in inflammed friable gall bladder.

Golden rules in case of difficulty

1. Clear identification of colon, pylorus, and duodenum is a prerequisite.

2. Fine needle aspiration to locate hidden C B D in fibrous tissue.

3. In severe inflammation in the Calot's traingle, open the gall bladder and extract all the stones and bile, then do either subtotal cholecystectomy, with cauterisation of the residual mucousal membrane and the cystic duct opening is closed by a catgut suture fro m within. An alternative is cholecystostomy.

CHOLECYSTOSTOMY

A procedure of compromise. A life saving one, which paves the way for safety at a later date for the performance of a definite operative procedure.

Indications

1.A cute cholecystitis with gall stones,

i) W hen the patient is aged infirm and toxic.

ii) Unusual technical difficulties like anatomic obscurations,extreme obesity.

iii) As a preliminary measure in suppurative cholangitis with obstruction of commonbile duct.

2. Chronic calculous cholecystitis - when there are risks involved in excising the gall bladder**.**

COMMON BILE CUCT EXPLORATION

Indications

Absolute

- If stones are felt in the biliary system
- Patient who is or was recently jaundiced per operatively.

- Patient with a recent history of severe biliary pain or rigors.
- Abnormal liver function tests, in particular a raised alkaline phosphatase.

Relative

- Past history of jaundice.
- Single faceted stone
- Multiple small stones
- Biliary sand
- C B D diameter more than 12 mm.

LAPAROSCOPIC CHOLECYSTECTOMY

It has become popular in just 5 years after its introduction by Mauret [1987]. The principle advantages are short hospital stay and early return to normal activity.

Equipments required

High flow C02 insufflator, a xenon light source, a cable to convey the high monitor video camera, irrigation devices, electrocautery and laparoscopy and laparoscopic instruments.

Technique

Under G A or epidural anaesthesia pneumoperitoneum is established with the patient in Trendelenberg position. Supra umbilical, epigastric, right mid clavicular and midaxillary 3-5 c m s incisions are made. C holecystectomy is performed and the gall bladder is delivered through one of the port usually the epigastric. Clips are used instead of ligation since it is simple and easy to apply them.

Indications

1. Cholelithiasis and biliary colic
2. Chronic calculous cholecystitis.
3. Symptomatic gall bladder polyps.
4. Resolved gallstone pancreatitis.

Contraindications

Relative Absolute

Acute cholecystitis	Acute cholangitis
Previous abdominal operation	Severe acute cholecystitis
Minor bleeding disorder	Acute Pancreatitis
Common bile duct stones	Peritonitis
	Portal hypertension
	Pregnancy

Complications

Perioperative Bleeding	Periumbilical Heamatoma
Biliary tract injury	Subpherenic abscess
Perforation of gastrointestinal tract	Chest pain
Subcutaneous emphysema	

Spillage of bile &. gallstones into the peritoneal cavity.

In a recent paper by Stahlschmdt M in Oct'92 which compared 816 conventional and 812 laparoscopic cholecystecto mies.[Largest series reported at present). In the conventionally operated group reoperation was required in 2.7% while in laparoscopic procedure it was less than 1.2 %.Mortality for open procedure is .5 % but for laparoscopic surgery none out of 812 cases.

Growing experience and better definition of the contra indications for the laparoscopic cholecystectomy might improve the results in future.

M ANGEMENT OR VARIOUS CLINICAL SITUATIONS

SY MPTOMLESS[SILENT] GALLSTONES

The previous controversy regarding the management of asymptomatic gallstones has been largely resolved by prospective studies which have shown that the vast majority of silent gallstones will not cause symptoms or complications during life. Comparative evaluation of expectant versus surgical management of asymptomatic gallstones has show n that cholecystectomy reduces marginally the life expectancy in addition to being substantially more costly.

Another argument for cholecystectomy in the past has been the prevention of gall bladder cancer, the development of which is known to be associated with the presence of

gallstones. However, carcinoma of the gall bladder is rare and the overall operative mortality with the widespread adoption of prophylactic cholecystectomy in patients with silent gallstones would certainly exceed that due to cancer of the gall bladder by a significant margin. The evidence linking cholecystectomy with the development of colon cancer remains conflicting and cannot be used as a further argument against prophylactic cholecystectomy. There is no indication for cholecystectomy in the management of patients with asymptomatic gall stone disease [C uschieri. A, 1988]

ACUTE CHOLECYSTITIS

Initial treatment with nasogastric suction, intravenous fluids and electrolyte replacement theraphy. Antibiotics and analgesics if required. Two surgical options are available. They are interval [delayed or elective] cholecystectomy and early cholecystectomy.

Interval Cholecystectomy

This is the traditional approach where the acute episode is being managed conservatively and subsequently after the complete resolution of the acute episode, patients are admitted after 2-3 months for elective cholecystectomy. These rationale for this treatment is that difficulties are encountered during surgery in the acute inflamatory episode.

Early Chalecystectomy

This is being performed for acute choecystitis increasingly nowadays. The patient is operated electively on the next available operating list or within a few days of ad mission. This must be distinguised from emergency Cholecystectomy, which is done immediately after admission when gall bladder perforation is suspected. The results of several prospective clinical trials have shown clearly that early cholecystectomy is equally safer to elective cholecystectomy. Mortality and morbidity are same for both the types of operation. But elective cholecystectomy has several disadvantages.

1. Failure of conservative treatment 10-15 %.
2. Premature further episodes while awaiting for the surgery 10-15 % .
3. Patient failing to report 10 %.
4. W hen surgery becomes imperative between second and fourth weeks the incidence of iatrogenic injuries is very high.

Early cholecystectomy is best performed using the fundus first approach. It is customary to administer prophylactic antibiotics.

CHRONIC CALCULOUS CHOLECYSTITIS

For the treatment of biliary pain non opiate analgesics preferably drugs are preferred because opiates may cause spasm of sphincter of oddi which cannot be countered by hyoscine. Antiemetics may be needed to control vomiting.

The definitive treatment of chronic cholecystitis is surgical cholecystectomy open or laparoscopic. There is little doubt that these patients should have their gall bladder re moved as approximately 30 % of them will develop complications if surgical treatment is delayed. The other option is non-surgical gallstone dissloution. It may be oral dissolution by drugs, extra corporeal shock wave lithotripsy or percutaneous transhepatic cholecystosomy.

ASSOCIATED DUCTAL CALCULI

The treatment is choledochotomy and cholecystectomy. The stones are extracted by means of biliary balloon catheters, stone grasping forceps or Dormia basket, preferably under visual control or with a choledochoscope. A "T" tube is inserted and choledochotomy wound closed. If CBD is grossly. dilated with papillary stenosis, a drainage operation is indicated. Choledochoduodenostomy or transduodenal sphincteroplasty is done. Endoscopic sphincterotomy and removal of stone is the recent and effective way to manage stones in CBD. Endoscopic sphincterotomy' with extraction of stone with D0RMIA basket under fluoroscopic control is the best and most effective method available. If the above fails because of large' stone sphincterotomy and stenting are done. Later lithotripsy is used to break the stone

AIMS OF THIS STUDY

1. To evaluate the age incidence, the sex incidence, the common etiological and risk factors of gall stones in this region.
2. To illustrate various types of clinical presentation in calculous cholecystitis.
3. To discuss the usefulness of different diagnostic procedures in a case of calculous cholecystitis.
4. To study the various modes of management and their results.
5. To study the bacteriology of the bile in calculous gall bladder disease.

6. To assess the incidence of postoperative complications.
7. To analyse the biochemical types of stones prevalent in this part of the country.
8. To study the histopathological changes in calculous gall bladder diseases.

MATERIALS AND METHODS

Forty patients of clearly documented cases of Gallstone diseases of the Gall bladder and biliary tract admitted in the surgical units and the surgical Gastroenterology unit of Thanjavur medical college Hospital between January 2005 to Jan'2006. constitute the material of this study.

A detailed History including that about previous treatment was elicited in all patients and thorough clinical examination was done in them.

Relevant preoperative investigations of blood, Urine, Plain X-ray abdomen and USG were done in all possible cases. The operative findings and postoperative complications were recorded and carefully analysed. The Gallstones removed were sent for Biochemical analysis in 24 cases and bile culture was done in 16 cases. The Gall bladder specimens of all the cholecystectomy cases were routinely sent for Histopathological examination.

OBSERVATIONS

Incidence

The overall incidence of Gallstone diseases was 0.1% of all hospital admissions (41,535) between January 2005 to Jan'2006. The 40 patients of gall stone diseases studied, ranged between 16 and 62 years of age. The mean age by 45 years. The maximum number of cases occurred in the fifth and sixth decades. The female to male ratio was 3.4 : 1. 37 patients in our series were Hindus, 3

patients belonged to muslim community. 37 (92.5%) belonged to Low Socio Economic Status. 30 patients were taking mixed diets.

CLINICAL PRESENTATION

Abdominal pain, which was localized to right Hypochondrium was the presenting symptom in 36 patients (90%) 5 cases presented with Jaundice and all of them were found to have CBD calculi Murphy sign was positive in 14 cases. Defying the courvoisier's law, the gall bladder was palpable in none of the cases. Three of our patients were diabetics.

BIOCHEMICAL INVESTIGATION

Four of our patients had elevated blood urea / creatinine levels. Two of our patients had elevated serum cholesterol level. In our series 5 cases showed, increased serum bilirubin, with a maximum level upto 7mg %. All the 5 cases of CBD stones showed increased levels of serum bilirubn and serum alkaline phosphatase. Prothrombin time was prolonged in one patient, which return to normal after administration of vit K.

RADIOLOGICAL INVESTIGATIONS

Plain X ray abdomen was taken for all cases, and radioopaque stones were seen in 3 (7.5%) cases.

ULTRASONOGRAM

Abdominal ultrasonogram was taken in all cases, except for two patients, who were taken as emergency 5 cases showed CBD stones with dilatation of CBD.

MANAGEMENT

All the 40 cases were operated Of the 40 pts. Cholecystectomy alone was done in 32 pts, who had only gall bladder stones 4 pts underwent choledochotomy and the stones were removed followed by 'T' tube drainage. In two cases, due to extensive adhesion, cholecystostomy alone was possible In one case cholecystectomy was done along with appendicectomy.

INCISIONS

Incisions for opening the abdomen for Gallbladder and biliary tract surgeries was a matter of individual preference right subcostal and right paramedian incision were commonly used.

Right paramedian 18 case 45%

Right subcostal 19 cases 47.5%

Midiline 3 cases 7.5%

Emergency cholecystectomy.

In our series 2 cases had presented with features of peritonitis. During laparotomy both cases were found to have gangrenous perforated gall bladder. In both cases, emergency cholecystectomy was done.

BACTERIOLOGY OF THE BILE

Bile culture was done in 16 cases. It was found to be sterile in 7 cases (43.75%) E.coli was grown in 6 cultures (37.5%) Klebsiella was grown in 3 cultures (18.75%)

BIOCHEMISTRY OF STONES

In 24 Patients, the stones were sent for Biochemical analysis.

Pure cholesterol stones were found in 3 cases (12.5%). Pure Pigment stones in 3 cases (12.5%) mixed stones were found in 18 cases. (75%)

HISTOPATHOLOGY

Of the 40 operated gall bladder specimens sent for Histopathological examinations, 29 (72.5%) showed features of chronic cholecystits, 9 showed features of Acute Cholecystitis and (22.5%) 2 (5%) showed features of gangrenous cholecystitis. No associated carcinnomatous changes were noted in this series.

DISCUSSION

Gall stone disease is a common occurrence. It is the commonest disease involving the biliary tract and is associated with significant morbidity and mortality. The prevalence of the disease is affected by multiple factors like geographical distribution, genetic factors, different life styles and infection in the biliary tract.

With modern improvements in preoperative and Postoperative care, a more aggressive surgical approach to calculus diseases of the Gall bladder has evolved.

INCIDENCE

The classical victim of gall bladder disease is a fat, fertile, flatulent, female of fifty (Rains et.al., 1978)

Gupta (1967) reported the range of 9-.80 yrs, while Vijaypal (1980) observed the range of 17-74 yrs and Tyagi et al., (1992) 18-70 yrs. Similarly a wide range (16-62 yrs) is observed in our series also. A maximum incidenc in 4^{th}, 5^{th} , 6^{th} decades was observed in Gupta et al., series, in Vijaypal et.al., series and Tyagi et.al series (1992) (63.4%). Similar observation was made in our study also.

The mean age of incidence in our study (45 yrs) is compared with other series in the table.

A varying female preponderence from 2.4:1 to 6.5:1 has been observed in several studies. In our series also there is a female preponderence with a female to male ratio of 3.4:1.

SOCIO ECONOMIC STATUS

People of lower socio economic status are at greater risk (90%) than those of high social status.

CLINICAL PRESENTATION

Almost all patients reported abdominal pain at sometime during the course of their illness, the location in Right hypochondrium being 90% in our series, which is comparable to 84% in Vijay Pal et.al., (1980)

Ganey e.al (1986) reported the incidence of Jaundice to be 10% in his series and Vijay Pal et.al., 22% in his series. In our series 5 cases, 12.5% had Jaundice.

Tenderness in Right hypochondrium was reported by Vijay pal et.al., (1980) in 68% of his cases. It was observed in 90% of our cases (36) patients.

BIOCHEMICAL INVESTIGATIONS

Serum bilirubin was above 2 mg % in 12 cases (16%) with a maximum level of 12.3 mg%. In Vijay Pal et. Al., (1980). In our series it was above 2 mg% in 5 cases (12.5%) with a maximum of 7mg%.

Serum alkaline Phosphatase level was within normal limits in only 19 cases (25.33%) in Vijay Pal et.al., series, where as in our study it was normal in 87.5% of patients.

As our series is too small, a definitive relationship between serum cholesterol and risk of gall stone formation could not be made from our study. Scargy et.al., (1984) has observed that mean concentrations of serum cholesterol are similar in patients with gall stones and controls and serum triglyceride has typically been raised in patients with gall stones compared wth controls.

RADIOLOGICAL INVESTIGATIONS

Plain Xray abdomen was taken in all cases. Radioopaque.. stones were detected in 3 cases (7.5%) Two cases 5% who presented with perforation showed features of paralytic ileus.

The results are compared with that salient et.al.,

	Present study 40 cases	Salleh et al 200 cases
Normal	35 (87.5%)	84 (38.00%)
Calculi	3 (7.5%)	37 (17.80%)
Enlarged GB	-	40 (20.00%)
Localised illeus	2 (5.00%)	32 (14.60%)

Ultrasonogram

Of all the investigations, USG was the most informative Of the 38 cases for which USG was done, all the 38 cases showed stones with an accuracy rate of 100%.

Solitary calculi was present in 13 cases, and multiple calculi was seen in 25 cases and CBD stone was seen in 5 cases. Our accuracy with USG is 100% comparable to Mcsherry e al., series (1989) 90% and that of Schwartz series (1990) 100% CBD exploration and choledocholithotomy was done in 5 of the 5 cases in whom USG showed dilatation of CBD. Thus the significant role of USG in obstructive gallstone disease is well emphasized in this series.

MANAGEMENT

Of the 40 patients operated in our study cholecystectomy was done in 32 cases, who had only gall bladder stones.

In 5 cases , Preoperative USG showed CBD stone and dilatation. In them choledocholithotomy was done and the stones were removed, followed by 'T' Tube drainage.

In two other cases, due to extensive adhesions, cholecystostomy alone was feasible.

In one case appendicectomy was done with cholecystectomy

The various methods of treatment adopted are compared with those of Vijay Pal et.al., and Ganey et.al., below.

	Present study	Vijay Pal et.al. (1980)	Ganey Et.al (1980)
Cholecystectomy	80%	90%	98%
Cholecystectomy and CBD exploration	12.5%	16%	27%

Cholecystostomy	5%	-	1%

CHOLECYSTOSTOMY

Cholecystostomy is a procedure of comprimise. But in emergency situation, due to patients general condition, surgeon has to resort to it.

In this series 2 patients had cholecystostomy. The first one had edematous calot's triangle and extensive adhesions to sorrounding viscera. Patient had LVF strain in ECG and elevated Urea / Creatinine. So cholecystostomy was done.

In other patient, who is a old case of CAHD with extensive adhesions, cholecystostomy was performed and gall stones were removed.

CHOLECYSTECTOMY

Cholecystectomy was the commonest procedure in our series.

EMERGENCY CHOLECYSTECTOMY

In our series 2 cases had presented with features of perforative. Peritonitis. During Laparotomy both cases were found to have gangrenous gall bladder with perforation. The incidence of perforation was 1% in a series reported by J.D.Wig (1990) in which he has analysed the causes of peritonitis. Incidence of perforated gall bladder in Ganey et.al., series was 1%. In this study, the incidence is 5% because of very small number of cases being studied. In both cases, cholecystectomy was done.

ELECTIVE CHOLECYSTECTOMY

This traditional approach which is still popular was followed in 38 cases of our study. The rationale for this treatment is that in most cases, the raised pressure

within the gallbladder lumen lifts the walls of the organ of the impacted stone, which then dislodges and falls into the lumen with resolution of the Inflammation, the view being held that it is safer to operate several weeks after the acute Inflammatory episode has subsided.

POSTOPERATIVE COMPLICATIONS

2 patients had wound infection and pus collection. pus was let out and sent for culture and sensitivity. Secondary suturing was done in one later. Biliary leak occurred in two cases. The leak subsided in 15 days without any surgical intervention.

MORTALITY

The mortality rate of 2.5 % in the present series was in agreement with that in an Indian study Vijay Pal et.al., 5.3% but higher than that reported by Western Studies (Mc Sherry et.al., (1989) and Ganey et.al., (1986) 1.7% and 0.5% respectively.

BACTERIOLOGY OF THE BILE

Bile culture was done in 16 cases of this series. It was found to be sterile in 7 cases. 9 cases (56%) Showed growth in culture. This is comparable with stewart et.al., 1987 (62%) E.Coli was growth in 6 cultures (37.5%) of our study. 50% of the cultures in Stewart et.al., series shown E.coli.

ANALYSIS OF STONES

In this series 75% of the stones were of mixed type. 12.5% of pure cholesterol and 12.5% of Pigment stones were noted. Similar high incidence of mixed stones had been observed in both western series Ganey (70%) and also in Indian series vijay pal 91.30% and Bansali 83.3%.

HISTOPATHOLOGY

In our series 29 patients showed features of chronic cholecystits, 9 showed features of Acute cholecystitis and 2 showed gangrenous changes. No associated carcinomatous changes were noted in this series.

SUMMARY AND CONCLUSIONS

Gallstone disease is the commonest disease involving biliary tract and is associated with significant morbidity and mortality. Patients with gallstone are not a homogenous group. They are now being detected with greater frequencies, with the advent of Ultrasonogram. 40 cases of well documented calculous cholecystitis

admitted in the Thanjavur Medical College Hospital during the period between jan 2005 and Jan'2006 were studied in depth.

The following conclusions were made in our study :

(1) The overall incidence of gallstone disease is 0.1% of all admissions during this period.

(2) The age incidence varies between 16 and 62 years and the mean age of incidence is 45 years. Patients of 4^{th}, 5^{th} , 6^{th} decades were the commonest victims.

(3) A female preponderance of 3.4:1 was observed in our study.

(4) Right Hypochondrial Pain was the commonest presentation of gallstone diseases.

(5) Ultrasonogram of the abdomen was invaluable in the diagnosis of gallstones because of its simplicity, safety, repeatability and an accuracy of100% in our series.

(6) Elective cholecystectomy was the most widely followed method of surgical treatment. Cholecystectomy starting at calot's triangle was the commonest technique used.

(7) Mortality rate in our series is 2.5%

(8) Mixed stones were the commonest variety in our study.

(9) The commonest histopathological change associated with gallstone was chronic cholecystitis. Associated carcinomatous change in calculous cholecystitis is nil in our series.

Medical dissolution of the stone though theoretical is not very popular with our Hospital patients, because of the non-availability LAPAROSCOPIC cholecystectomy is now replacing the open cholecystectomy,. But in our institution. It is not available. However open cholecystecomy has its value in smaller hospitals and peripheral centers as the only method of treatment. It is therefore necessary that a surgeon should have the adequate knowledge and experience in this field.

In Judicially selected, carefully prepared and operated cases, the results are bound to be gratifying.

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PROFORMA

Name D.O.A.

Age D.O.D

Sex D.O.O

IP No. Unit

compliantsPresent History

Pain : Site

Duration

Character

Radiation

Relation to deep breathing

Aggravating factors

Relieving factors :

Vomiting / Nausea

Fever

Duration / Grade / Nature / asso c chills and rigor

Flatulent dyspepsia

Colour of Urine

Colour of stool

Past History

Similar complaints

Jaundice

Fever

Diabetes

Hypertension

Cirrhosis

Personal History

Family History

Menstrual History

DIET :

VEG

MIXED

OILY Food intake

Treatment History :

HIO Any drug intake

OCP

General Examination

Temp :

Pulse Rate :

Jaundice

Anemia

Features of Hyperlipidemia

Examination of abdomen

Inspection

Paipation

Tenderness Site

Murphy sign

Liver

GB

Spleen

Associated conditions

Renal Disease

Colonic motility disorder

Reflux Esopghagitis

Investigations

Urine : Albumin | Sugar

Bile Salt | Bile Pigments

Blood : Hb %

TC DC ESR

Blood Sugar

Urea

Serum Creatinine

LFT : Sr Bilirubin

Sr. Alkaline Phosphatase

SGOT / SGPT

Prothrombin time

Plain X ray Abdomen

USG : GB Stones Multiple Solitary

Wall thickness

Enlargement of GB

CBD stone

CBD dilatation

Liver

Operative Details

Emergency

Elective

Incision : (RT) Subcostal

(RT) Paramedian

Midline

Anatomic Findings

GB Enlarged

Inflammed

Gangrenous

Procedure

Cholecystectomy	Fundus First
	Calot's Triangle First
Cholecystostomy	Simultaneous

CBD Exploration

'T' Tube kept

Any other procedure

Stones : No

Size

Shape

Texture

Post Operative Period

Complications

Fever

Biliary Leak

Peritonitis

Wound infection

Removal of Drain

Removal of Suture

Removal of 'T' Tube

Total period of stay

Analysis of stone

Biopsy Report

Microbiology Report.

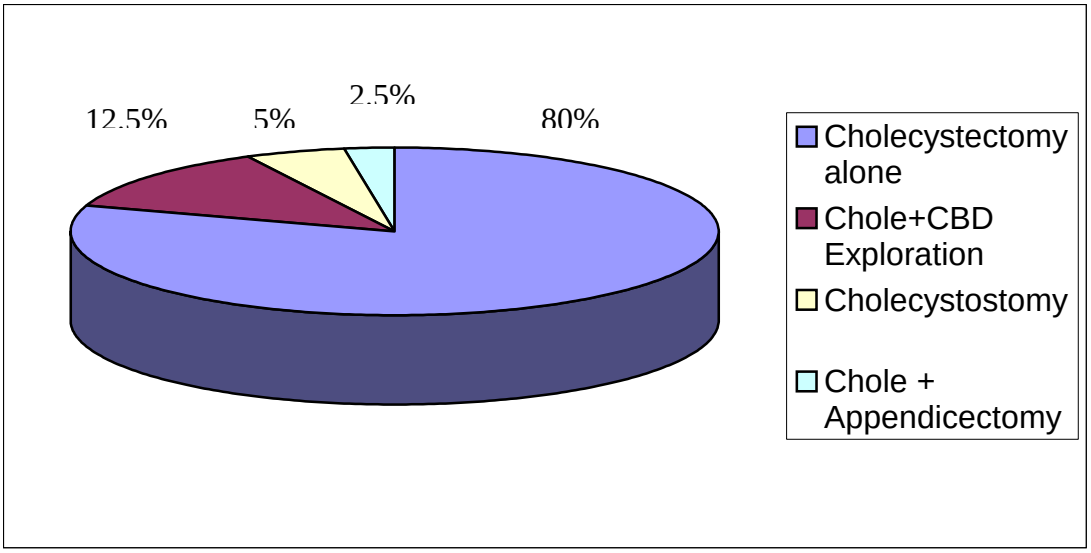
Master chart

No.	Name / IP No.	Age / Sex	Final Diagnosis	Biochemical Parameters	USG	Procedure	Post. Op problems
1.	Amirtha Rao 827708	53 / M	Chronic Cholecystitis	WNL	Multiple Calculi	Cholecystectomy	-
2.	Kamaraj 827683	26 / M	Chronic Cholecystitis	WNL	Multiple calculi	Cholecystectomy	-
3.	Loganayaki 829209	56 / F	Chronic Cholecystitis	WNL	Solitary Calculi	Cholecystectomy Fundus first	-
4.	Pannirselvam 829212	42 / M	Acute cholecystitis	WNL	Solitary Calculi	Cholecystectomy	-
5.	Indira 830862	16 / F	Chronic cholecystitis	WNL	Solitary Calculi	Cholecystectomy	-
6.	Rani 830862	46 / F	Acute Cholecystitis	WNL	Solitary Calculi	Cholecystectomy	-
7.	Vallikannu 835859	50 / F	Chronic Cholecystitis	Sr.AIK.Ph↑ Sr.Bilirubin↑	Multiple GS c CBD STONE & CBD Dilatation	Cholecystectomy C CBD Exploration	Biliary leak
8.	Malathy 835919	29 / F	Chronic Cholecystitis	WNL	Multiple Gallstones	Cholecystectomy	-
9.	Laxmi 836338	43 / F	Chronic Cholecystitis	WNL	Multiple Gallstones	Cholecystectomy	-
10.	Pappa 838242	55/F	Chronic Cholecystitis	Bl.Sugar ↑	Multiple Gallstones	Cholecystectomy	Wound Infection
11.	Kajirabeevi 838988	23/F	Acute Cholecystitis	WNL	Multiple Calculi	Cholecystectomy	-
12.	Pitchiammal 840060	50 / F	Chronic Cholecystitis	Bl. Urea↑ Sr.creatinine	Multiple calculi	Cholecystectomy	-
13.	Vasantha 840143	45 / F	Chronic cholecystitis	Sr.Cholesterol ↑	Solitary Calculi	Cholecystectomy	-
14.	Prabavathi 840143	45 / F	Chronic cholecystitis	Sr. Alk. Phos ↑	Multiple Calculi	Cholecystectomy	-
15.	Govindharaj 840959	60 / M	Chronic cholecystitis	Sr.Alk. Pho↑ Sr. Bilirubin ↑	Multiple Calculi CBD stone	Cholecystectomy C CBD Exploration	-
16.	Mariappan 841197	54 /M	Chronic cholecystitis	Bl. Sugar↑	Solitary Calculi	Cholecystectomy	Wound infection

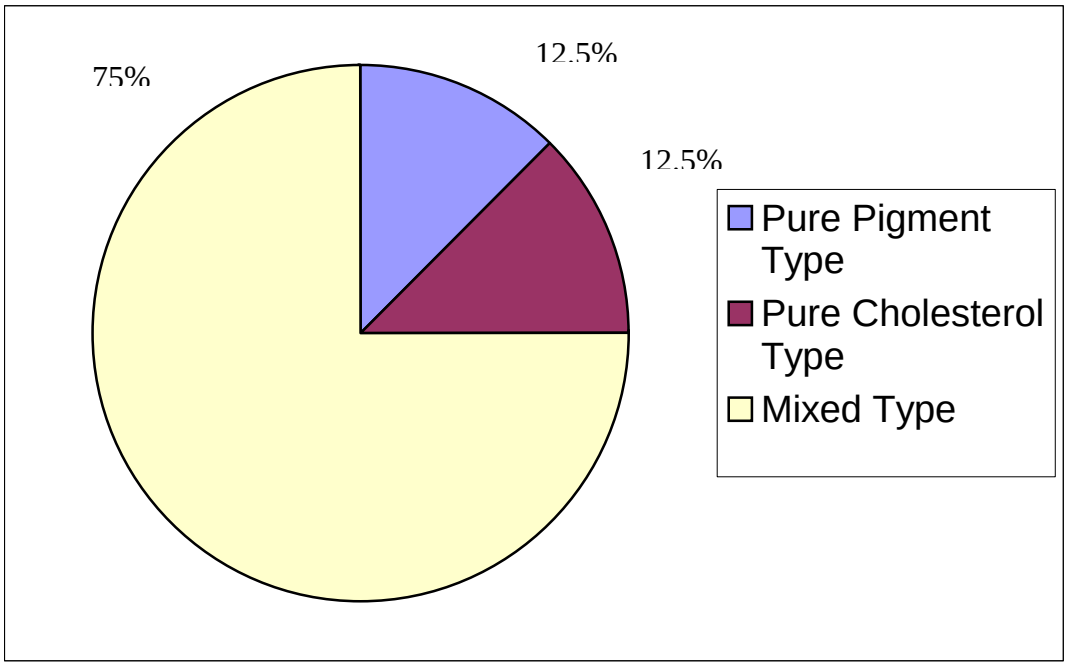
17.	Petchiammal 842952	40 / F	Acute cholecystitis	WNL	Solitary Calculi	Cholecystectomy	-
18.	Rajammal 843049	60 / F	Chronic cholecystitis	Bl. Urea↑ Sr.creatinine ECG. LV strain	Multiple calculi	Cholecystostomy	-
19.	Chinnapillai 842957	55 / F	Gangrenoun Cholecystitis	Bl. Urea↑ Sr.creatinine ECG. LV strain	-	Cholecystectomy Emergency	Death 11th PODCARDiA Failure
20.	Shanthi 843102	49 / F	Chronic cholecystitis	WNL	Solitary Calculi	Cholecystectomy	-
21.	Basiriya 843104	40 / F	Chronic cholecystitis	WNL	Multiple GS thickened GB	Cholecystectomy	-
22.	Kaliyaperumal 844013	51 /M	Chronic cholecystitis	Sr.Bilurubin↑ Sr. Alk. Phos↑	Multiple GS CBD stone c CBD Dilatation	Cholecystectomy C BD Exploration	-
23.	Backiyam 844013	51 /F	Acute cholecystitis	↑Cholesterol	Solitary Calculi	Cholecystectomy	-
24.	Chinnamani 845026	33/F	Chronic cholecystitis	WNL	Multiple GS c CB Contracted	Cholecystectomy	-
25.	Rajamani 845260	50 / F	Chronic cholecystitis	WNL	Multiple Stones	Cholecystectomy	-
26.	Subashini 851061	19 / F	Chronic cholecystitis	WNL	Solitary Calculi	Cholecystectomy Appendicectomy	-
27.	Jeyaram 861886	48 / M	Acute Cholecystitis	WNL	Multiple Calculi c Edematous GB	Cholecystectomy	-
28.	Banumathi 863813	60 / F	Chronic cholecystitis	Bl urea↑ Sr. creatinine Old case of CAHD	Multiple Calculi	Cholecystostomy	-
29.	Natarajan 864535	40 / M	Chronic cholecystitis	WNL	Multiple canculi	Cholecystectomy	-
30.	Krishnaveni 865254	42 / F	Chronic cholecystitis	S.Bilirubin ↑ Sr.Alk.Phos ↑	Multiple GB Calculi c CBD Stone	Cholecystectomy CBD Exploration	-
31.	Maruthammal	38/	Acute	WNL	Solitary	Cholecystectomy	-

	870307	F	cholecystitis		Calculi		
32.	Saraswathy 873321	45 / F	Acute cholecystitis	WNL	Solitary Calculi & Thickened GB	Cholecystectomy CBD Exploration	-
33.	Vijayalakshmi 873703	46 / F	Chronic cholecystitis	WNL	Multiple GS	Cholecystectomy Fundus First	-
34.	Chellammal 875530	45/F	Chronic cholecystitis	WNL	Multiple GS	Cholecystectomy	
35.	Pattammal 875992	40/F	Chronic cholecystitis	WNL	Multiple GS	Cholecystectomy	-
36.	Rani 877132	55 / F	Chronic cholecystitis	Sr.Bilurubin ↑ Sr.Alk.Phos↑	Multiple GS c CBD Dilatation	Cholecystectomy c CBD Exploration	-
37.	Abunisha 817246	45 / F	Chronic cholecystitis	WNL	Solitary Calculi	Cholecystectomy Fundus First	-
38.	Saroja 866715	40 / F	Chronic cholecystitis	WNL	Multiple Calculi	Cholecystectomy	-
39.	Parvathy 867377	50 / F	Acute cholecystitis	WNL	Multiple Calculi	Cholecystectomy	-
40.	Gopal 869513	55 / M	Gangrenous cholecystitis	Bl – Sugar ↑	-	Cholecystectomy	-

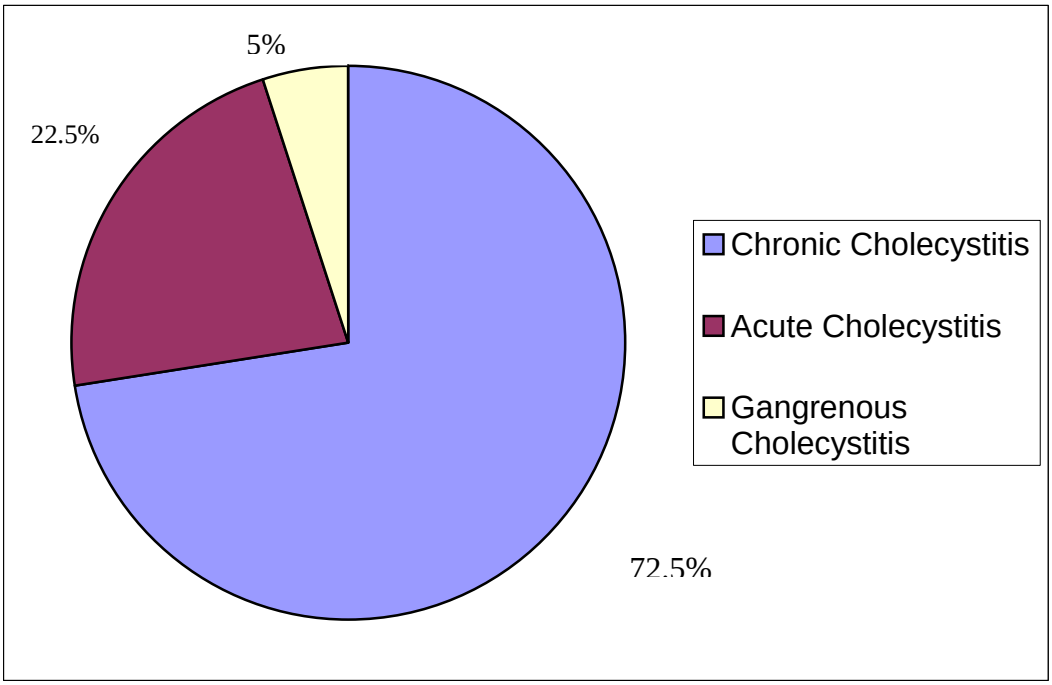
MANAGEMENT

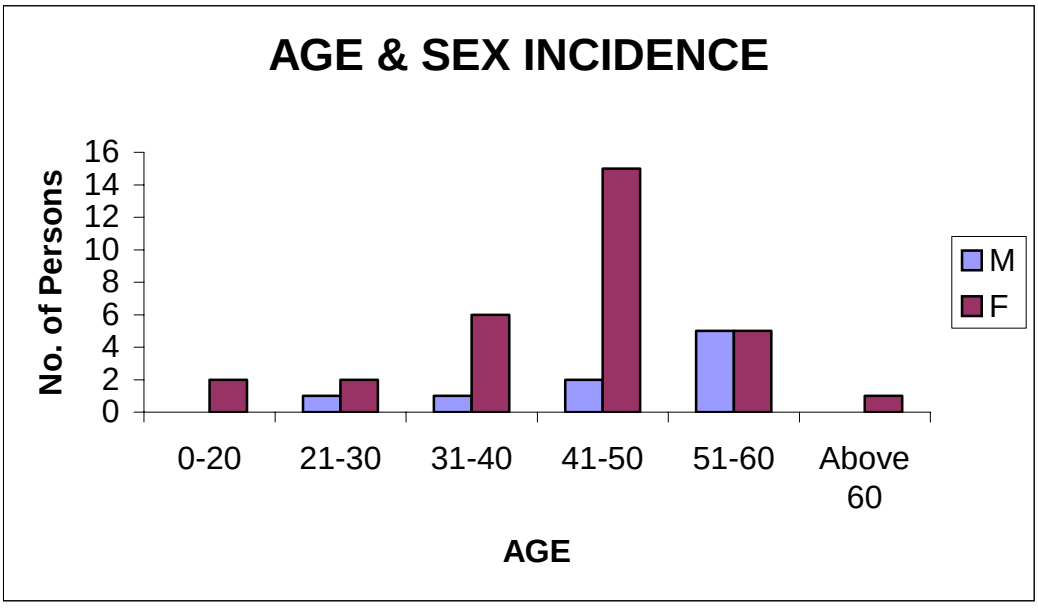


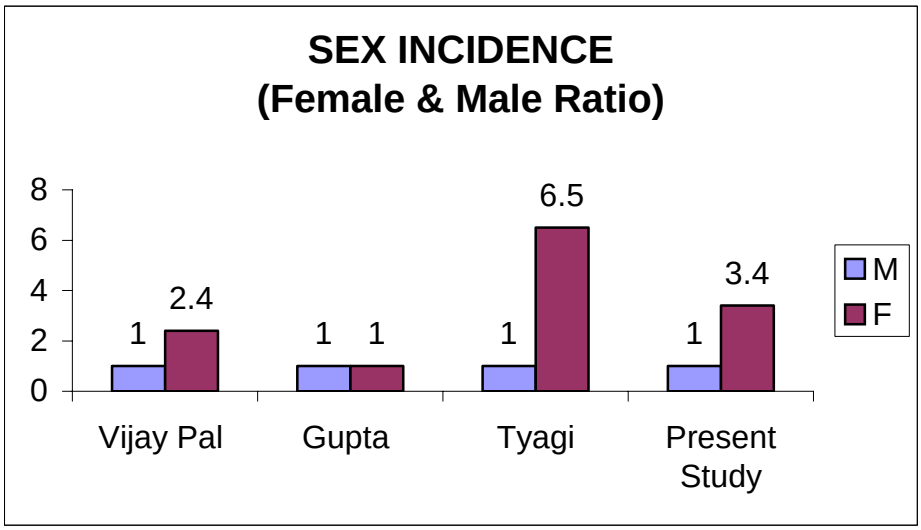
GALLSTONE ANALYSIS



HISTOPATHOLOGY







BACTERIOLOGY OF BILE